

PaperCut HP Chai Embedded Manual

Contents

1	Overview	3
1.1	Consistency	3
1.2	Integration.....	3
1.3	Rate of development.....	3
1.4	Vendor Neutral.....	3
1.5	Security.....	3
2	Installation	4
2.1	HP Device Compatibility.....	4
2.2	Requirements	4
2.3	Setup Procedure.....	5
2.3.1	PaperCut Settings.....	5
2.3.2	Install PaperCut Application Files.....	5
2.3.3	Configure PaperCut embedded settings	6
2.3.4	Configure Device Authentication Settings	7
2.3.5	Disable HP Web Print	8
2.3.6	Disable the “Hold Off Print Job” setting	8
2.3.7	Shorten Panel Timeout	9
2.3.8	Additional Network Security (optional)	9
2.4	Verify the successful installation and configuration	9
2.5	Test Preparation	10
2.6	Scenario 1: Standard copying	11
2.7	Scenario 2: Copying with account selection	12
2.8	Scenario 3: Print release.....	13
2.9	Scenario 4: Scanning and faxing.....	15
2.10	Upgrading to a newer version.....	16
3	Configuration.....	17
3.1	Device Function	17
3.2	Authentication Methods	17
3.3	Shared Account Selection.....	18
3.4	Customizing Text and Messages	18
4	Advanced Configuration	20
4.1	Config Editor	20
4.2	Configuring Swipe Card Readers.....	21
5	Uninstalling.....	26
6	Known Limitations and Security.....	27

6.1	Interface responsiveness	27
6.2	Account selection & other interface limitations	27
6.3	Zero Stop when Copying.....	27
6.4	Simplex Pages in Duplex Jobs.....	27
6.5	Copy restrictions on restricted accounts.....	27
6.6	Faxing.....	28
7	Supported Card Readers.....	28

This manual covers the HP Chai embedded MFD setup. For general PaperCut MF documentation, please see the [PaperCut MF manual](#).

1 Overview

This manual provides an overview of the installation, configuration and operation of PaperCut's embedded software MFD (Multi-Function Device) solutions. Today's MFDs are smarter – they have touch screens and offer the ability to run applications directly on the device. The goal of PaperCut Software's embedded MFD solution is to leverage these smart devices and to provide walk-up copier users with the same set of rich application features provided in the print control area. These include:

- Secure access to device functions (via Card Swipe, Username and Password, etc.)
- End user authentication including integration with single sign-on environments
- Monitoring and control of photocopying, scanning and faxing (quotas, charging, allocation and logging)
- Allocation of copying, scanning and faxing to accounts/departments/cost-centers/projects
- Release jobs from a hold/release queue (Secure & Find Me Printing)
- Group based access control: Limit access to color copying or to the device as a whole to selected user groups.

Highlights of the embedded solution include:

1.1 Consistency

The embedded solutions are developed in-house by the PaperCut Software development team. This ensures that the copier interface is consistent with the workstation print interface, meaning users only have to learn one system.

1.2 Integration

PaperCut is a single integrated solution where print, internet and copier control are all managed in the one system. Users have a single account and administrators have the same level of reporting and administration for all services. The embedded solution interacts with the PaperCut server using a Service Oriented Architecture (SOA) and web services based protocols.

1.3 Rate of development

PaperCut is developed under a release-often policy where new features are made available to users as soon as they are complete. Unlike hardware based solutions, new versions can be delivered to users regularly as software updates.

1.4 Vendor Neutral

PaperCut remains true to its vendor neutral stance. All embedded solutions are equal and support all server OS's including Windows, Linux and Mac.

1.5 Security

A large percentage of PaperCut's user base is in Education environments where security is important. All embedded solutions are developed with security in mind. Where security objectives can't be satisfied, any deficiencies are fully disclosed.

2 Installation

This section covers the installation of the PaperCut embedded application for compatible HP devices. The embedded application will allow the control, logging and monitoring of walk-up off-the-glass copier usage and may serve as a print release station for network prints (for information on just tracking network printing see the PaperCut user manual).

2.1 HP Device Compatibility

HP devices run multiple embedded platforms. This manual covers the HP devices running the “HP Chai” platform (AKA “HP Chai SOE DSE”). The devices supporting this platform are listed below. If your device is not listed it may be running the “HP FutureSmart” platform (codename “Jedi”), which is covered in the manual titled “PaperCut MF - HP FutureSmart Embedded Manual”.

To check if a device is running the FutureSmart or Chai platform, log into the device’s EWS and navigate to **Information → Configuration Page** and look for the **Firmware Version** label in the **Device Information** section. On Chai devices this label is missing (but **“Firmware Datecode”** will be present). On FutureSmart devices the value will begin with “FutureSmart”:

Firmware Version:	FutureSmart 2 SP1 (2200643_228337)
Firmware Revision:	2200643_228337

Supported HP Chai devices:

- CM3530 MFP series
- CM4730 MFP series
- CM6030 MFP series
- CM6040 MFP series
- CM6049 MFP series
- M3035 MFP series
- M4345 MFP series
- M4349 MFP series
- M5035 MFP series
- M5039 MFP series
- M9040 MFP series
- M9050 MFP series
- M9059 MFP series

PaperCut makes all attempts to keep the product compatibility information in this manual current. However, we make no warranties, express or implied, with respect to manufacturer’s products or the interoperation with the listed PaperCut product(s). We offer 40 day trial versions of PaperCut software to assist you with compatibility testing with your network setup.

2.2 Requirements

Before installing the PaperCut Embedded Application into the HP device, ensure that basic monitoring of network printing has been setup up and tested for this device. The device should show up in the printer list in the PaperCut web interface and have a few print jobs in its print history.

After that, ensure that the following points are checked off before getting started:

- Ensure you have a compatible HP device (see above) and that the device has the *latest* firmware installed.
- PaperCut is installed and running on your network. Please see the ‘Introduction -> Quick Start Guide’ section of the PaperCut user manual for assistance.
- Ensure that the HP device is connected to the network.
- Have available the network name or IP address of HP device.
- Have available the username and password for administrator access to the devices internal web interface.
- It is recommended that the device be configured with a *static IP address*.
- Verify that firewalls or other network restrictions don’t prevent the device’s access to the PaperCut server on port 9193.

2.3 Setup Procedure

2.3.1 PaperCut Settings

- Ensure PaperCut is setup on your server and monitoring print activity before proceeding to install the embedded application.
- Log into the PaperCut administration interface using a web browser (e.g. <http://papercut-server:9191/admin>).
- Navigate to ‘Options -> Advanced’ and ensure the option ‘Enable external hardware integration’ is enabled.



- Press ‘Apply’.

2.3.2 Install PaperCut Application Files

- The PaperCut embedded application for HP is provided in 4 files with the file extension “jar”. One file, `pc-hp.jar` is located under your PaperCut installation directory on the server, in the subdirectory
`[app-path]/providers/hardware/hp`
 Choose the other three files from the subdirectory there under according to your device model:
 - group20: LaserJet M5035 MFP, LaserJet M3035 MFP, LaserJet M4345 MFP, Color LaserJet CM4730 MFP, LaserJet M9040 MFP, LaserJet M9050 MFP
 - group30: Color LaserJet CM6030 MFP, Color LaserJet CM6040 MFP
 - group40: Color LaserJet CM3530 MFP

(If you are unsure of which group your device belongs to, please contact your HP reseller. Yes, it confuses us too!)
- Now, open the HP device web configuration page using the following URL in a web browser:
`http://<device-ip>/hp/device/this.loader`
 where <device-ip> is the IP address of the device.

- You may be presented with a browser certificate warning. Proceed with the connection / dismiss the warning.
- If asked a username and password, provide the username and password for administrator access to the device's internal web page.
- Upload the 4 jar files chosen previously in the following order:
 1. hp_laserjet_cgui_xx.jar,
 2. hp_laserjet_securityservices_xx.jar,
 3. hp_laserjet_securityagent_xx.jar,
 4. pc-hp.jar
 using the following procedure:
 - Next to the field "Enter package file" click the "Browse ..." / "Choose File" button.
 - Find the jar file on your hard disk.
 - Click "Load Package Now".
 - Wait for a confirmation to appear. This may take up to 1 minute.
 - Click the link below the confirmation to go back to the package loader page and repeat for the next jar file.
- Once the procedure has been completed, you should see a list under "Reloadable packages" similar to this:

Reloadable Packages

Package Name	Package URN	Select
hp.laserjet.security.agent	urn:hp:laserjet:security:agent	<input type="checkbox"/>
hp.laserjet.security.services	urn:hp:laserjet:security:services	<input type="checkbox"/>
Chai GUI	urn:hp:laserjet:cgui	<input type="checkbox"/>
PaperCut	urn:papercut:activator	<input checked="" type="checkbox"/>

- Note: The order displayed might be different, this is not important.
- Note: The PaperCut name will be presented as a clickable hyperlink. Click this hyperlink to access the PaperCut embedded configuration for the next section.

2.3.3 Configure PaperCut embedded settings

- Using a web browser, go to the PaperCut embedded configuration page either by clicking the hyperlink in the Package Loader page from the previous section or by directly entering the address
`http://<device-ip>/hp/device/papercut.home`
 into your browser, where <device-ip> is the device's IP address.
- Fill in a descriptive device name and the IP address or hostname of the PaperCut server.
 - Note: The device name should be chosen to uniquely identify this HP device among all devices controlled by PaperCut, including devices from other manufacturers. Examples are: "HP 1" or "Library Copier"

Settings

Device Name:	Library Copier
Identifies the device in the PaperCut device list. Example: "HP 1" or "Library Copier"	
Server IP/Hostname:	192.168.1.23
The application server IP address or hostname.	
Server Port:	9193
The port that is used for binary communication to the server, this must be cleared in all routers and firewalls involved. Default: 9193	
Locale Override:	
Optional ISO language or ISO language+country code in format xx_XX for an application language different from the system language. Examples: fr, pt_PT	
Apply Changes	

- Click “Apply Changes”.

2.3.4 Configure Device Authentication Settings

- Using a web browser, go to the device’s internal web page at: <http://<device-ip>>.
- Log in as administrator.
- Navigate to Settings > Authentication Manager.
- Adjust the following settings, note that not all settings may be available on your device:
 - Set “Sign In At Walk Up” to “PaperCut Device Login”.
 - Set “Copy” and “Job Storage” to “PaperCut Copy Control”.
 - Set “Color Copy” to “PaperCut Color Copy Control”.
 - Set “Send to E-mail”, “Send Fax” and “Send to Folder” to “PaperCut Scan Control”.
 - **Note:** Perform all these steps even if you don’t intend to track copying or scanning etc. at this time. The choice which operations to track will be made later in the PaperCut administration interface.

Configure Device

Tray Sizes/Types	Authentication Manager	
E-mail Server		
Alerts		
AutoSend		
Security		
Authentication Manager		
LDAP Authentication		
Kerberos Authentication		
Device PIN		
User PIN		
Edit Other Links		
Device Information		
Language		
Date & Time		
Sleep Schedule		
Restrict Color		
Home Screen Setup		

Help

Set the Device Functions that require users to successfully sign in before use. Each function can require a different Sign In Method.

Home Screen Access	Sign In Method
Sign In At Walk Up	PaperCut Device Login
Device Functions	Sign In Method
Copy	PaperCut Copy Control
Color Copy	PaperCut Color Copy Control
Send to E-mail	PaperCut Scan Control
Send Fax	PaperCut Scan Control
Send to Folder	PaperCut Scan Control
Job Storage	PaperCut Copy Control
Create Stored Job	None

- Click “Apply”.

2.3.5 Disable HP Web Print

HP Web Print is a function of HP devices that allows users to upload files to the device via the embedded web interface and have them printed, thereby bypassing PaperCut accounting. Access to this feature should be disabled. (Note: PaperCut provides Web Print as a core device independent feature).

This can be done in the administrator web interface on the “Settings” tab

- click “Security” on the left side,
- under “Device Security Settings” click “Configure”,
- find the “Home Page” section (scroll down),
- untick “Display Print Page on Information Tab” and click “Apply”.
- This procedure may vary according to your specific model.

2.3.6 Disable the “Hold Off Print Job” setting

By default HP devices have a 15 second delay to start printing network print jobs when someone is using the device (e.g. logged in to the device LCD). This can cause a 15 second delay to print jobs when a user releases a job from a hold/release queue.

This setting may be disabled either through the device LCD or through admin web interface. To disable via the admin web interface:

- Login to the device web interface as admin.
- Navigate to Settings > Configure Device
- In the tree view, open “Device Behavior” -> “General Copy Behavior”
- Change the “Hold Off Print Job” setting to “Off”

The screenshot shows the 'Configure Device' page with the 'Settings' tab selected. Under 'Configure Device', the 'Device Behavior' section is expanded, and the 'General Copy Behavior' sub-section is selected. The 'Hold Off Print Job' setting is set to 'Off'. The 'Hold Off Time' is set to '15' seconds. The 'Information' tab is also visible at the top.

- Press “Apply” to save the changes.

2.3.7 Shorten Panel Timeout

To avoid ‘tailgating’ – i.e. users using the device on another user’s account, the device should be configured to automatically log out the current user after a short time of inactivity only. By default, this is set to 60 seconds, however 10 seconds is considered a good compromise between security and usability.

To change the panel timeout, access the devices web page at [http://<device-ip>/](http://<device-ip>) and go to the section Settings > Configure Device > Device Behavior (options will appear below) > Inactivity Timeout. Change the timeout to “10” and click “Apply”.

2.3.8 Additional Network Security (optional)

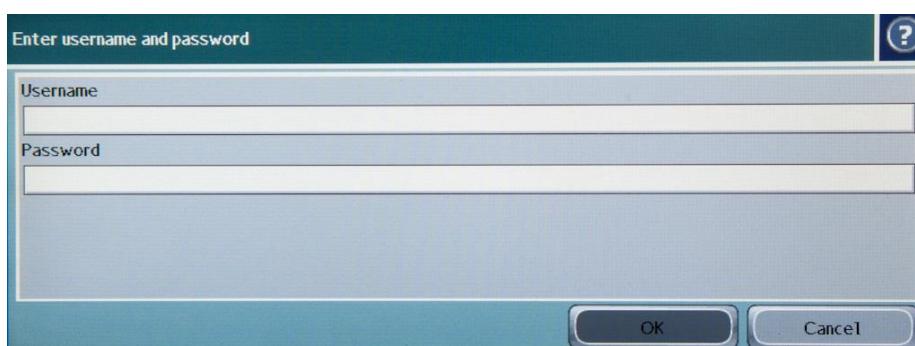
The MFP communicates with the PaperCut server over the network (e.g. to authenticate users or release print jobs). To provide an additional level of security, PaperCut may be configured to only allow device connections from a restricted range of network addresses. This ensures that only approved devices are connected to the PaperCut server.

By default PaperCut will allow device connections from any network address. To restrict this to a subset of IP addresses or subnets:

1. Logon to the PaperCut administration web interface at <http://<papercut-server>:9191/admin>
2. Go to the Options→Advanced tab and find the “Security” section.
3. In the “Allowed device IP addresses” field enter a comma-separated list of device IP addresses or subnets (in the format <ip-address>/<subnet-mask>).
4. Press the “Apply” button.
5. Test the devices to ensure they can continue to contact the PaperCut server.

2.4 Verify the successful installation and configuration

- On the device screen you should see a login prompt asking for username and password.



- Log on to the PaperCut administration web interface at <http://<papercut-server>:9191/admin>. On the Devices tab, you should see the device listed under the name chosen previously.
- You should now proceed to configure page costs and other settings relating to the device post-install testing

After completing installation and basic configuration it is recommended to perform some testing of the common usage scenarios. This important for two reasons:

1. To ensure that the embedded application is working as expected
2. To familiarize yourself with the features and functionality of PaperCut and the embedded application.

This section outlines four test scenarios that are applicable for most organizations. Please complete all the test scenarios relevant for your site.

2.5 Test Preparation

To complete these tests it is recommended you use two test users so that each can be configured differently. These users are:

- ‘testusersimple’ – is used to perform basic copier monitoring and control and to perform print release tests.
- ‘testuseradvanced’ – is used to perform copier monitoring and control with the account selection enabled (i.e. to charge copying to accounts/departments/cost-centers/etc).

To setup these users in PaperCut:

1. Create the ‘testusersimple’ and ‘testuseradvanced’ users in your Active Directory or LDAP directory.
2. Login to the PaperCut’s admin web interface
3. Go to the “Options->User/Group sync” page and press “Synchronize Now”.
4. Once the sync is complete, the users will be added to PaperCut.

The next step is to configure the users. To configure ‘testusersimple’:

1. In PaperCut, select the “Users” tab
2. Select the ‘testusersimple’ user.
3. Set the user’s balance to \$5.00 and verify the account is set to “Restricted”.

Account Details

To set the user's balance enter the value here. To adjust the amount (like adding 5 credits), select the 'adjust' link. Making the user 'restricted' means that they will not be able to print when their account has no credit.

Balance
\$5.00 ([adjust](#))

Restricted

Overdraft
[Use default overdraft \(\\$0.00\)](#)

4. Verify that this user is set to “Automatically charge to personal account” in the “Account selection” options.

Account Selection

Account selection can be used to allow the user to select what account is charged, or even to confirm print jobs before they are sent to the printer. These options require running the user client tool on workstations.

Print account selection

Automatically charge to personal account

5. Press the “OK” button to save.

To configure ‘testuseradvanced’:

1. In PaperCut, select the “Users” tab
2. Select the ‘testuseradvanced’ user.

3. Change the “Account Selection” option to “Standard account selection popup” and enable all the account selection options.



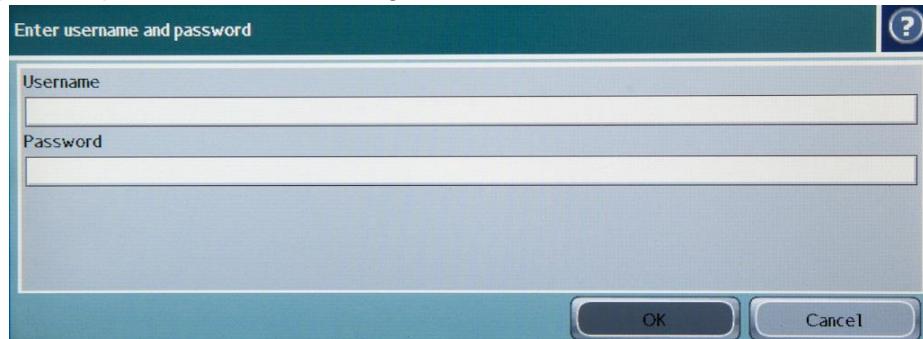
4. Press the “OK” button to save.

2.6 Scenario 1: Standard copying

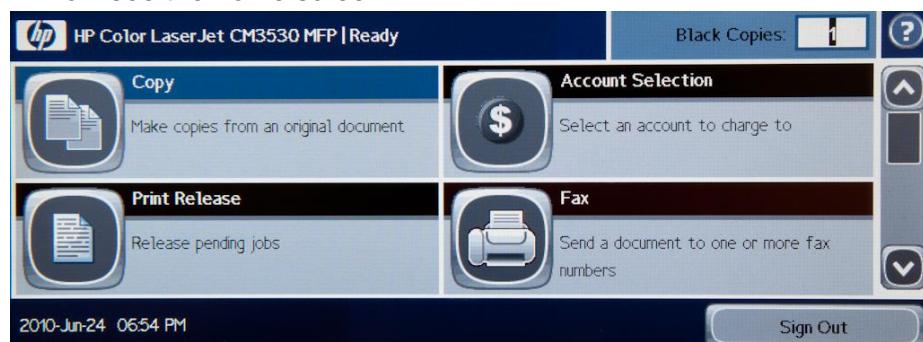
Standard copying involves monitoring/charging printing to a user's personal account. This is the most commonly used for student printing or basic staff monitoring. Users can also be configured for unrestricted printing, which is commonly used for staff/employee use.

At the photocopier:

1. The photocopier should be showing the screen as shown below.



2. Press the blank field underneath “Username”, enter the username “testusersimple” using the on-screen keyboard and press “OK”. Likewise, press the “Password” field and enter the password previously chosen.
3. Press “OK”.
4. You will now see the home screen:



5. At this point the copier will be enabled for usage.
6. Perform some test copying, i.e. press the green button on the device button panel and perform a copy as normal.
7. Once completed copying press the “Sign Out” button on the device's screen.

Back in the PaperCut application verify that the copier activity was recorded and the user's account deducted.

1. Log in to PaperCut.
2. Select the device from the “Devices” tab.
3. Select the “Job log” tab. This will list all recent copying activity on the copier. The copying just performed as the test user should be listed. Verify the details of the copy job that was just performed.

Usage Date ▼	User	Charged To	Pages	Cost	Document Name	Attrs.
Apr 16, 2008 2:59:30 PM	testusersimple	testusersimple	2 (Color: 0)	\$0.20	[copying]	A4 (ISO_A4) Duplex: No Grayscale: Yes

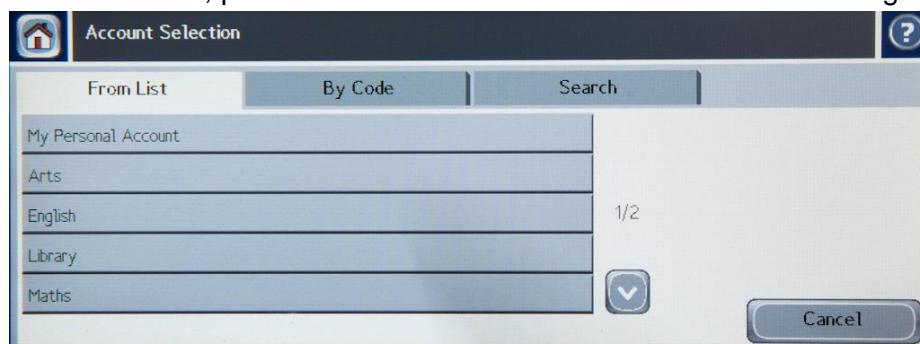
2.7 Scenario 2: Copying with account selection

Firstly a test account should be created:

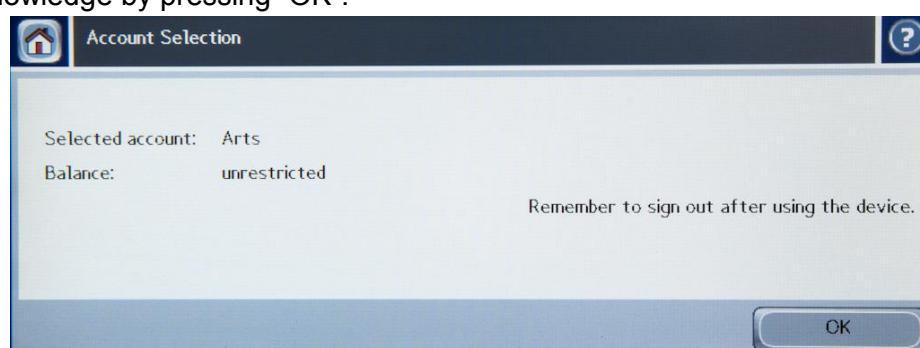
1. Log into PaperCut, select the “Accounts” tab.
2. Select the “Create a new account...” action link on the left.
3. Enter an account name “Test Account 1”.
4. Enter PIN/Code “2233”.
5. Select the “Security” tab and allow all users to access that account by adding the “[All Users]” group.
6. Press “OK”.

At the photocopier:

1. The photocopier should be showing the “Authentication” screen as before.
2. Enter the username ('testuseradvanced') and password as before and press “OK”.
3. On the home screen, press “Account Selection”. You will see the following:



4. Press “Test Account 1”.
5. The confirmation screen will show that “Test Account 1” has been selected. Acknowledge by pressing “OK”.



6. Now perform copying as normal and finally log out using the “Sign Out” button as before.

Back in the PaperCut application verify that the copier activity was recorded and the user's account deducted.

1. Log in to PaperCut
2. Select the device from the “Devices” tab
3. Select the “Job log” tab. This will list all recent copying activity on the copier. The copying just performed as the test user should be listed.
4. Verify the details of the job (i.e. that the job was charged to the selected account).
5. In the log details, click on the “Charged To” account name to view the account's details.
6. Selecting the “Job log” tab will display all print/copy activity for the account, and will show the test photocopying that was performed.

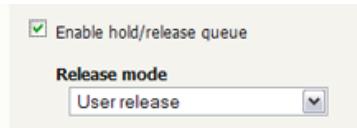
2.8 Scenario 3: Print release

The embedded application may also be used for print release. For full description of PaperCut hold/release queues and release stations, please read the PaperCut manual.

Skip this scenario if hold/release queues will not be used at your site.

To perform print release testing a hold/release queue must be enabled:

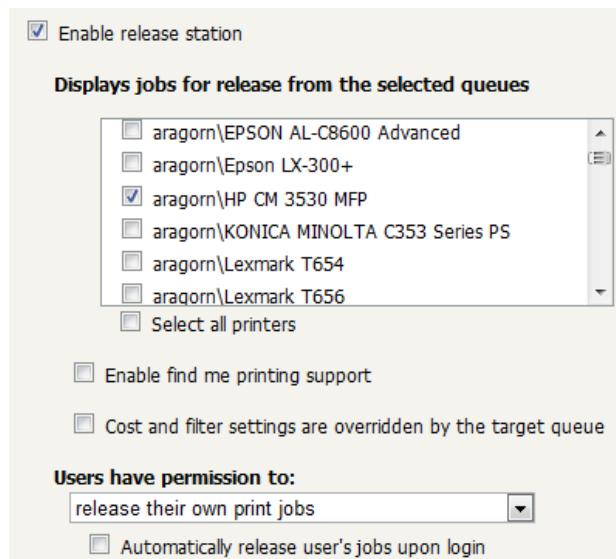
1. In PaperCut, select the “Printers” tab.
2. Select the print queue (i.e. not the ‘device’) for the HP device that will be used for testing.
3. Enable the “Hold/release queue” option.



4. Press OK/Apply to save the changes. All printing to this queue will now be held until released by a user.

Make sure the copier is enabled as a “Print Release Station”.

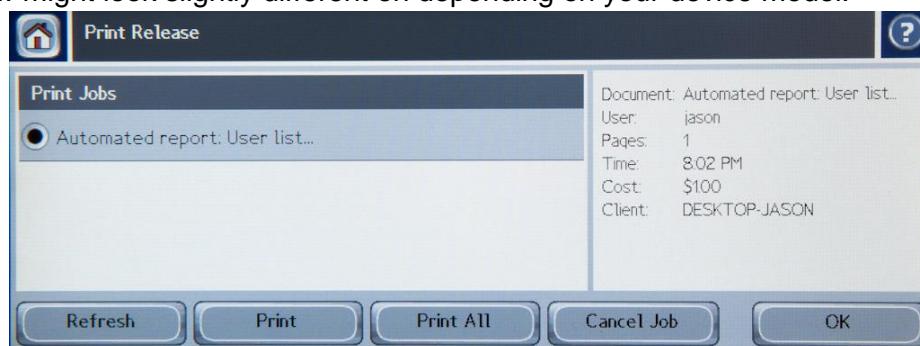
1. In PaperCut, select the “Devices” tab.
2. Select the HP device.
3. Under “Device function”, tick “Enable release station”.
4. Select the print queue that was enabled for hold/release above. The HP device will allow jobs on the selected queues to be released.



5. Press “OK” to save.
6. Login to a computer workstation as ‘testusersimple’.
7. Print a few jobs to the print queue that was configured above. The jobs will be held in the hold/release queue.
8. Confirm that the jobs are held, by checking that the jobs are listed in the “Printers -> Jobs Pending Release” page of the PaperCut administration interface.
9. Confirm that the username is ‘testusersimple’.

At the device:

1. Log in with the ‘testusersimple’ username and corresponding password as in scenario 1.
2. Press the “Print Release” button. A list of print jobs will show. Note that the screen below might look slightly different on depending on your device model.



3. As you select different print jobs, the details window on the right will reflect the details of the currently selected job.
4. Now select a job and press the “Print” button at the bottom of the screen. The print job will be queued for printing and a confirmation screen will show briefly.
5. To cancel a print job, select the print job and press the “Cancel Job” button on the screen.
6. Finish releasing or deleting jobs by pressing the “Home” button at the top left of the screen.
7. Remember to sign out using the “Sign Out” button on the home screen.

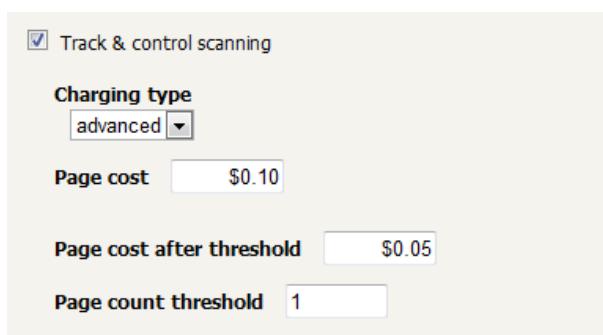
2.9 Scenario 4: Scanning and faxing

HP devices can also scan documents and send them by email or to a network folder. If a phone line is attached, they can send faxes. You can enable the tracking of scans and faxes. Users can be prevented from scanning or faxing when they are out of credit.

Note: Due to limitations in the current device architecture faxes cannot be distinguished from or tracked separately from scans. All faxes will be tracked as scans and prices and logged accordingly.

To enable tracking of scans and faxes:

1. In PaperCut, select the “Devices” tab.
2. Select the MFD device.
3. Under “Device function” tick “Track & control scanning”.
4. Select the charging type “advanced” set some numbers for page costs and thresholds. The cost after the threshold should be lower than the standard cost as it represents a volume discount. As an example, the screen shot below shows that the first page of a scan is charged at \$0.10 and any subsequent page at \$0.05.



At the photocopier:

1. Log in using username and password as ‘testusersimple’.
2. Press “E-mail”, enter an email address, place some sheets in the document feeder and press the Start button.
3. The device will proceed to scan and send an email with an attached PDF file to the email address.
4. After the scan, the device will ask you whether you would like to remain signed in. Press “No” to log out.

In the PaperCut administration interface verify that the scan was recorded and the user’s account was deducted. This can be done as follows:

1. Log in to the PaperCut administration interface.
2. Select the device from the “Devices” tab.
3. Select the “Job Log” tab. This will list all copying, scanning and faxing activity on the copier, with faxes shown as scans. The job just performed as the test user should be listed. Verify the details of the job that was just performed.

Usage Date	User	Charged To	Pages	Cost	Document Name	Attrib.
Dec 9, 2009 11:44:35 AM	testusersimple	testusersimple	5	\$0.30	[scanning]	

4. Click on the user's name in the user column to view the user's account details.
5. Select the "Job log" tab to display all activity for the user.
6. Select the "Transaction History" tab and verify that the cost of the scan was deducted from the user's account.

Transaction date ▼	Transacted by	Amount	Balance after
Dec 9, 2009 11:45:23 AM	[system]	-\$0.30	\$4.40

2.10 Upgrading to a newer version

The procedure for upgrading an existing embedded application to a newer version is similar to the initial installation (see 2.3.2), simply upload updated .jar files over the existing ones. Afterwards, check the PaperCut Embedded Settings (see 2.3.3) to ensure the previously entered settings are still intact.

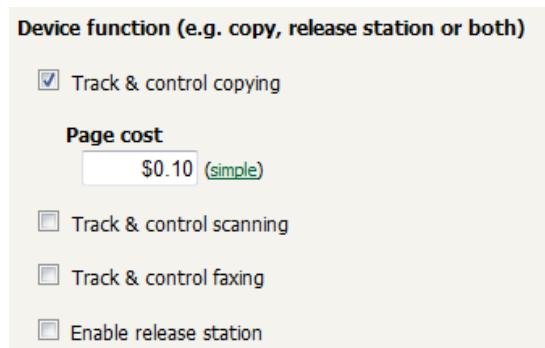
After upgrading, it's worth quickly checking the Embedded Application's version number now matches the expected value.

3 Configuration

After completing the Installation section and registering the device with PaperCut, it will have been configured with reasonable default settings that are suitable for most environments. This section covers how to change the default settings. All the following settings are available via the device's 'Summary' tab in the PaperCut administration interface.

3.1 Device Function

The device function setting defines which functions will be available on the device and how it will be used. Not all function settings are supported on all devices.



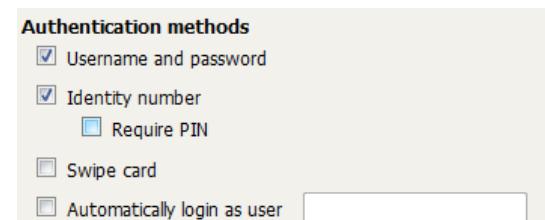
Each device function is discussed in the following table.

Device Function	Description
Track & control copying	The device will track walk-up off-the-glass copying.
Track & control scanning	The device will track scanning such as scan-to-email or scan-to-file.
Track & control faxing	The device will track the sending of faxes.
Enable release station	The device will act as a print release station.

3.2 Authentication Methods

PaperCut supports a number of different ways to authenticate users who walk-up to the devices to perform copying. The default authentication method is username and password authentication.

The available authentication methods can be modified in the 'External Device Settings -> Authentication methods' section.



Authentication methods available for a device

Not all authentication methods are supported on all devices. A grayed-out option indicates that the option is not supported on this device.

Each authentication method is discussed in the following table.

Authentication Method	Description
Username and password	The user may use their domain/network username and password to log into the device.
Identity number	The user may log in with their identity number. Identity numbers are convenient when usernames are long or cumbersome to enter. For example, rather than entering a username like 'john.smith.001', it may be more convenient to enter an employee ID of '1234'. See the PaperCut user manual for information about user identity numbers, including importing identity numbers from an external source.
Identity number -> Require PIN	When a user logs in with their identity number, they must also provide their associated PIN. This provides additional security for identity number logins.
Swipe card	The user may log in by swiping a card (e.g. smart card, RFID and supported by the device). See the PaperCut user manual for information about user card numbers, including importing card numbers from an external source.
Swipe card -> Require PIN	When a user logs in by swiping a card, they must also provide their associated PIN. This provides additional security for swipe card logins.
Swipe card -> Enable self-association with existing user accounts	Users can swipe cards previously not used or registered at the device with PaperCut and will be prompted for their username and password. The swipe card can then be used at subsequent logins. See chapter 4.2 for advanced configuration of this function.
Automatically login as user	Specifies that this device should always automatically log in as the given user. This option overrides all other authentication methods

Description of authentication methods

3.3 Shared Account Selection

Shared account selection options at the MFD mirror the options presented in the PaperCut client print popup. The options available include:

- Select from a list of shared accounts
- Search for shared accounts by keyword
- Select account using PIN/Code

The options available to each user, as well as account security access, will mirror the same options available when the user prints. "Select from list" and/or "Select using PIN/Code" are controlled at the user level via the *User Details* page. The Security tab on each account controls account security /access.

3.4 Customizing Text and Messages

PaperCut allows some text that appears in the device to be customized. The custom text might include instructions or terminology that is more appropriate for the site. An example of

text that is customizable is the “welcome text” that displays before the user logs in to the device.

The text can be customized by editing the device configuration from the PaperCut administration interface. For more details see the Advanced Configuration section.

4 Advanced Configuration

4.1 Config Editor

The common configuration options for a device in PaperCut are available on the device's 'Summary' tab, and are discussed in more detail in the Configuration section. This section covers the more advanced or less common configuration options which are available via the 'Advanced Config' tab in the device details screen.

Config name	Description
ext-device.hp.message.welcome	Specify two lines of text to appear on top of the login screen in place of the default message. These can include instructions on which username and password are valid for the device. The value "DEFAULT" in this field will re-enable the default text.
ext-device.hp.email.personalized-sender	If set to "Y" and the email field of the user logged onto the HP device has been populated in PaperCut, will set this email address as the "From" field in the scan-to-email function.
ext-device.hp.screen.small	Set to Y or N depending on whether your device has a small (640x240 pixel) or large (800x300 pixel screen). In most cases this will be automatically detected and the setting will not have to be adjusted.
ext-device.hp.restricted.allow-multiple-login	Setting this to "Y" will allow users to log in and charge copy jobs to a restricted account (user account or shared account) if another copy job charged to the same account is still in progress. This may cause cost overruns with users going into negative balance.
ext-device-msg.card-association	Message to display when users are requested to associate their swipe card with an existing user account. See chapter 3.2 for details. Specify "DEFAULT" for the default text.
ext-device.self-association-allowed-card-regex	Specify a regular expression that limits which card numbers are accepted for associating swipe cards with user accounts. See chapter 3.2 for details. Please contact PaperCut support for help with regular expressions. Defaults to ":" (dot-star) which includes all card numbers.
ext-device.card-self-association.use-secondary-card-number	Select whether user self-association should occupy the primary or secondary card number. It overrides the global setting unless the keyword "GLOBAL" is specified. This is useful when there is a mix of different non-configurable card readers that read different numbers from an ID card. Set to "Y" to use the secondary card number, "N" to use the primary card number. Default: "GLOBAL" to defer to the global configuration option.
ext-device.hp.limit-reference.paper-size	PaperCut will deny copy access to restricted users who do not have enough balance to copy. To determine if a user has enough balance to copy and to compute the allotted

ext-device.hp.limit-reference.duplex	number of pages, a reference copy is required. By default PaperCut checks if the user has enough balance to copy one single sided Letter (North America) or A4 (worldwide) page. In some situations it may be desirable to change the reference copy, such as when the device allows smaller page sizes like A5.
ext-device.hp.limit-reference.grayscale	Default for ext-device. hp.limit-reference.duplex: N (No) Default for ext-device. hp.limit-reference.grayscale: N (No) Default for ext-device. hp.limit-reference.paper-size in North America: Letter Default for ext-device. hp.limit-reference.paper-size worldwide: A4
ext-device.hp.release.list-format	Change this to change the displayed list of print jobs pending release to include details in addition to or in place of the document name. Use the following place holders for document details: %document% - document name, %user% - username, %pages% - no. of pages, %time% - time of printing, %cost% - cost of print job, %client% - machine the print job was sent from. Example: "%user% - %document%" would show jobs in the form "jsmith – Tax Form.pdf".
ext-device.hp.release.show-busy	Set to yes to show a warning message when users are releasing documents while the device is still busy printing or copying. (Only on LeSF v2.1.)
ext-device.hp.release.show-busy.job-timeout	When above option is enabled then jobs that have been paused (paper jam, out of paper) for this time are considered not to be keeping the printer busy.
ext-device-msg.busy-on-release	Message to display when above option is enabled. Specify "DEFAULT" for the default text.
ext-device.card-no-regex	See chapter 4.2 "Configuring Swipe Card Readers"

4.2 Configuring Swipe Card Readers

HP devices support the following keyboard emulating USB card readers:

- Elatec TWN3 prox card readers
- MAGTEK Swipe Reader Model # 21040110
- RF IDEAS AIR ID Enroll Proximity Reader Model # RDR-7081AKU

Other keyboard emulating USB card readers may work, but should be tested prior to deployment.

Supporting Card Reader authentication is as easy as:

1. Connecting a supported card reader to the device via the USB port (Note: On some devices this is hidden under a sticker on the side panel).

2. Enabling *Swipe card* as an *Authentication method* under the device's configuration in PaperCut's web interface.
3. Ensure the card number, as read by the reader, is loaded into the Card Number field in the PaperCut database (or consider using user self-association).

Swipe cards contain numbers used to identify users according to the card number configured in the User Details screen under "Card/Identity" number. Some readers report information in addition to the number encoded on the card, such as checksums. PaperCut can treat these cases in three ways:

Card Number Needs No Conversion

- A typical case is the checksum being reported after the card number, separated by an equals sign, such as in 5235092385=8. PaperCut can handle this case by default; it will extract the number before the equal sign as the card number:
5235092385.

Regular Expression Filters

- For some cases, a "regular expression" *may* be required that will filter the card number from the complete string of characters reported by the card reader. Documentation on regular expressions can be found on the Internet, e.g. at www.regular-expressions.info.
 - The regular expression must be fashioned so that the card number is returned as the first match group.
 - Usually one regular expression will be used for all the devices managed by PaperCut; this must be entered in the "Config editor (advanced)" which you will find on the Options tab under Actions. The key is called "ext-device.card-no-regex".
 - The global setting however can be overridden on a per-device basis: The key "ext-device.card-no-regex" can also be found on the "Advanced Config tab in the device details screen. This setting will override the global setting unless the keyword "GLOBAL" is specified.
 - PaperCut developers will gladly assist in producing a regular expression when supplied with a few sample outputs from your card reader. Please contact PaperCut support.
 - If you would like to write your own regular expressions, here are some examples:
 - Use the first 10 characters (any character): (. {10})
 - Use the first 19 digits: (\d{19})
 - Extract the digits from between the two "=" characters in "123453=292929=1221": \d*=(\d*)=\d*

Card Number Format Converters

In addition to extracting parts of the card numbers using regular expressions, converting numbers from one format to another is a common requirement. For example a card reader may report in hexadecimal format, while the number stored in the source (e.g. Active Directory) is in a decimal format. PaperCut includes a number of inbuilt converters to assist here.

Note: Many card readers are configurable - the number format can be changed at the hardware level via utility or configuration tools. PaperCut's software-level converters are

there to support card readers that don't offer this level of configuration, or where a global software-level conversion is a better choice. For example it may be quicker to do the conversion in PaperCut rather than manually reprogram 100+ readers!

Like regex's, the converters may be defined on either a global (all devices) or on a per-device basis.

To set globally:

- Options -> Actions -> Config Editor
- Search for “ext-device.card-no-converter”
- Enter the name of the required converter (see table below) and click **Update**

To set at the device level:

- Devices -> [select device] -> Advanced Config Editor
- Search for “ext-device.card-no-converter”
- Enter the name of the required converter (see table below) and click **Update**

Standard Converters

Converter	Description
hex2dec	Convert a hexadecimal (base 16) encoded card number to decimal format. Hexadecimal numbers usually contain 0-9 and A-F. This will convert “946EBD28” to “2490285352”.
dec2hex	Convert a decimal encoded card number to hexadecimal format. This will convert “2490285352” to “946EBD28”.
ascii-enc	Unpack an ASCII encoded card number string. E.g. given the number “3934364542443238”, the ASCII code “39” is converted to 9, “34” -> 4, “45” -> E, with the entire number resulting in “946EBD28”.
javascript:<path>	Advanced: Define a custom conversion function in JavaScript (see below)

It is possible to chain or pipeline converters by delimiting with a pipe (|). For example, ascii-enc|hex2dec will first unpack the encoded ASCII number then convert it to a decimal.

Tip: Not sure which converter to use? Often trial and error is a good approach. After presenting a card, the number will appear in an application logger message with conversions applied (assuming the card is unknown to the system). Try different converters and inspect the resulting numbers in the application log.

Using custom JavaScript

If the inbuilt converter functions are unable to meet the requirements, it is possible to define your own function using JavaScript. This is an advanced exercise and it is expected that

any implementer be familiar with programming and JavaScript. To implement your own converter:

1. Create a file text file [install-path]/server/custom/card.js
2. Define a single JavaScript function in this file called “convert” It should accept and return a single string. Here is a trivial example:

```
function convert(cardNumber) {  
    return cardNumber.substring(3,10).toLowerCase();  
}
```
3. Enter a converter in the form: javascript:custom/card.js

Tip: Check the file [install-path]/server/log/server.log when testing. Any scripting errors will be displayed as warning messages in the log.

Tip: A Javascript script may also be included in the pipeline. For example
ascii-enc|hex2dec|javascript:custom/card.js

Other advanced notes

- If *both* a regular expression and a converter are defined, the regular expression is applied first. This means a regular expression can be used to clean up the input (e.g. remove checksum or delimiters) before passing to a converter.
- In some special situations a custom JavaScript implementation may not be enough. For example there may be a requirement to use a 3rd party system to decrypt the number. PaperCut includes an advanced plugin architecture that the PaperCut Software development team uses to implement these advanced converters. Please contact support to discuss development options and costs.

5 Uninstalling

In order to remove PaperCut copy tracking and release station functionality from the device:

- Using a web browser, go to the device's package loader at <http://<device-ip>/hp/device/this.loader> .
- Click the check box next to the “PaperCut” entry in the list of “Reloadable Packages”.
- Click “Remove Selected Package”.
- Go to the device's main web page at <http://<device-ip>> .
- Navigate to Settings > Authentication Manager.
- From the “Sign in at Walk Up”, “Copy” and “Color Copy” drop-down lists select “None” each.
- Click “Apply”.

In order to reactivate PaperCut functionality on the device, recommence installation as per the installation chapter of this document.

6 Known Limitations and Security

HP devices have some limitations that have an impact on functionality and security.

6.1 Interface responsiveness

The HP devices have very limited processing power and the interface in some areas such as the login, seems a little unresponsive. Care has been taking to optimize this code, however due to limitations in the framework some areas are not as responsive as we would like.

6.2 Account selection & other interface limitations

In an ideal implementation, users would be prompted to select an account when they click the copy button. The HP framework however does not support custom screens in this area – just a single message. This is why account selection is done via a separate button (acting as a separate application). HP plans to address this in their new upcoming architecture.

It would also be nice to have support for custom logos and colors on the login screen. The upcoming architecture will offer some options here.

6.3 Zero Stop when Copying

In an ideal implementation, PaperCut would be able to control exactly how many pages a user can copy and always prevent the user from overrawing their account. HP devices can limit copying on a page count basis with the following limitations:

1. The copier does not report the paper-size, duplex or color information to the embedded application until the job completes. So PaperCut must enforce the copy limits based on assumptions as to which paper size, duplex setting and color setting the users choose for their copy jobs. By default, the copier assumes A4 or Letter size paper, simplex copying and color copying. This is a conservative setting for an A4/Letter copier, i.e. actual copy settings will result in costs equal or below those based on these assumptions. This can result in copying being denied to the users in spite of sufficient credit. Configuration options are provided that allow an administrator to configure a more generous setting with the implication that users may overdraw their accounts.
2. When the permissible numbers of pages have been copied, the copy process is not immediately halted but – due to the pipelined processing of pages – may continue for another 3 or 4 pages, resulting in a small overdraw of a user's account.

6.4 Simplex Pages in Duplex Jobs

Copying performed with the “duplex” setting – the output format set to “2-sided” – may produce the occasional 1-sided page if the number of pages of a batch placed on the document feeder is odd and the copier therefore only prints on one side of the final sheet. While PaperCut’s print accounting counts these single final pages as simplex, in case of the HP embedded solution such pages are counted as duplex.

6.5 Copy restrictions on restricted accounts

Users are prevented from logging in with a restricted account (user account or shared account) if another copy job charged to the same account is still in progress. Copy jobs in progress can be viewed using the “Job List” button on the device screen. Once the previous copy job has finished, users can log in again and charge to the restricted account. This behavior can be overridden using a configuration key, please see chapter 4.1.

6.6 Faxing

Faxes can currently not be tracked separately from scans and are currently logged and charged as scans. This implies a single pricing scheme for both scans and faxes, i.e. the cost per page would have to be the same for faxes as it is for scans.

7 Supported Card Readers

All keyboard-emulating card readers are supported as well as the HP Common Card Reader (CCR).